

Unit 3 Review

In addition to knowing vocab definitions, be sure you can apply them to understand the following:

Ch 6

- Catabolism vs Anabolism
 - Is energy released or consumed?
 - Are complex molecules broken down or built?
 - What are examples of each type of reaction?
 - Do they increase or decrease entropy?
- Energy and Thermodynamics
 - What are the different forms of energy and why are they important to life?
 - How do the 1st and 2nd laws of thermodynamics affect living organisms?
- Gibbs Free Energy (ΔG)
 - What factors influence ΔG ?
 - How can ΔG be used to predict if a process is energetically favorable (spontaneous)?
- Exergonic vs endergonic Reactions
 - Is energy released or consumed?
 - Is ΔG positive or negative?
 - Is the reaction spontaneous or not (and WHY)?
 - What does the magnitude of ΔG represent?
- ATP
 - For what kinds of work can ATP be used and how does it do so?
- Enzymes
 - How do enzymes speed up reactions?
 - What happens to enzymes during reactions?
 - What conditions affect the activity of enzymes?
 - How do cofactors (including coenzymes) and inhibitors (competitive vs noncompetitive) affect enzymes?
 - Why is cooperativity considered allosteric regulation?
 - How does feedback inhibition work?

Ch 7

- Catabolic pathways
 - How do aerobic respiration, anaerobic respiration, and fermentation differ from each other?
 - What do they have in common? (Note: similarities are summarized well at end of chapter)
- Redox reactions
 - Oxidation vs reduction
 - Does the substance lose or gain electrons?
 - Reducing vs oxidizing agent
 - Which is the electron donor vs acceptor?
 - During cellular respiration
 - What substance becomes oxidized vs reduced?
 - What is the reducing vs oxidizing agent?
 - What is the function of NAD^+ ?
 - What path do electrons take?

- Stages of cellular respiration (ie-glycolysis, pyruvate oxidation and citric acid cycle, oxidative phosphorylation including electron transport chain and chemiosmosis)
 - Where does each occur?
 - What enters vs what is released?
 - What is the significance of each product? (ex-needed for next stage, energy, waste, etc.)
 - Which are examples of substrate-level vs oxidative phosphorylation and what is the difference?
 - When is oxygen needed and why?
- Fermentation
 - When is it necessary and why?
 - What is the difference between alcohol and lactic acid fermentation?
 - What is the difference between obligate and facultative anaerobes?
- Significance of glycolysis
 - How do we know glycolysis is a very ancient process?
 - How is glycolysis (and the citric acid cycle) connected to other metabolic pathways?

Ch 8

- Leaves and Chloroplasts
 - How do their structures fit their functions?
- Photosynthesis vs Respiration (info in 8.1 AND end of 8.2)
 - In what ways are they similar vs different?
 - Energy
 - Endergonic vs exergonic
 - Sources
 - Reactants vs Products
 - Anabolic vs catabolic
 - Structures involved
 - Spatial organization of chemiosmosis
- Light reactions vs Calvin cycle (reviewed at end of chapter as well)
 - Where does each occur?
 - What enters vs what is released?
 - What is the significance of each product? (ex-needed for next stage, energy, waste, etc.)
- Light
 - How is wavelength related to amount of energy?
 - Why do leaves appear green?
 - What color wavelengths are absorbed vs reflected by chlorophyll?
 - What is the significance of accessory pigments?
- Calvin cycle
 - What is the significance of each of its 3 phases?
- Adaptations for dehydrations
 - How do different types of plants conserve water?
 - C₃ vs C₄ vs CAM
 - How do these adaptations affect photosynthesis?
 - Photorespiration